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Journal of the Society of Arts.

FRIDAY, APRIL 17, 1857.

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NOTICE TO CANDIDATES.

Persons who intend to offer themselves as Candidates at the Society's Examinations in June next, in London and at Huddersfield, are desired to take notice that no one will be admitted to the Examinations who shall not have sent in his "Return paper" to the Secretary of the Society of Arts, before Monday next, the 20th inst.

Forms of the "Return paper" may be had on application to the Secretary of the Society of Arts.

EXHIBITION OF INVENTIONS.

The Society's Ninth Annual Exhibition of Inventions was opened on Monday, the 23rd ult. The Exhibition will be open every day till the 23rd of May, from 10 a.m. to 4 p.m., and is free to the members and their friends. Members, by tickets or by written order bearing their signature, may admit any number of friends.

ART TREASURES EXHIBITION.

The Council of the Society of Arts have appointed a Committee to make arrangements for organizing a visit of the members to the Art Treasures Exhibition at Manchester.

EIGHTEENTH ORDINARY MEETING.

Wednesday, April 15, 1857.

The Eighteenth Ordinary Meeting of the One Hundred and Third Session was held on Wednesday, the 15th inst., Edwin Chadwick, Esq., C.B., in the chair.

The following Candidates were balloted for and duly elected members of the Society:—

Aird, Charles.
Blake, Rev. William.
Greenwood, Thomas.
Hall, Samuel Carter.
Kinder, Arthur.
Nash, Frederick John.
Newton, Frederick.

The following Institutions have been taken into Union since the last announcement:—

434. Derby Working Men's Association.
435. Portland Breakwater Mechanics' Institution.
436. Lewes Improvement Association.
437. Portsea Athenæum and Mechanics' Institution.

The following Colonial Institution has been taken into Union since the last announcement:—

Toronto Mechanics' Institution.

The paper read was:—

ON HOUSES AS THEY WERE, AS THEY ARE, AND AS THEY OUGHT TO BE.

By John W. Papworth, F.R.I.B.A.

A Society that for a hundred years has applied itself to the encouragement of the judicious application of capital in arts, manufactures, and commerce, needs no apology for considering a few of the results of the employment of capital on some buildings and in some building operations; that is to say, for considering the durability, convenience, and beauty, the cost, profit, and value, which some of our buildings, especially dwellings, at present afford under competition and insufficient education. Any one of these subjects offers materials for an evening's discussion, and, therefore, short explanations and descriptions only can be given; facts and figures must be taken as proved; and there will only be three definitions which must be borne in mind, viz., of the building owner, the architect, and the builder.

A building owner, is a private person, who invests his money in a building as a speculation, and who generally knows nothing of the construction and cost of the building. A person who invests his money in a matter of which he knows nothing, with not any guarantee as to the stability of the undertaking, and no information as to the character of the man with whom he is to entrust that money, is one of the most lamentably ill-educated people that the inquiries of this Society can discover; yet such is the case with a large proportion of those who either rent, buy, or pay for building any edifice of any sort.

An architect is a person whose business it is to know in his mind the building thoroughly which he has to design before it exists; to proportion the number and sizes of the rooms and their parts to their uses; to arrange them in a convenient manner; to give beauty to those parts and their details; and to place these graceful portions in good relative positions as to the inside and outside of the building; to foresee all the essentials required by custom, health, law, locality, materials, site, &c., especially by the intention and prescribed expense of the building; to choose amongst the various methods of sound construction; and to be so reputable that his decision as to the meaning of contracts and the quality of the materials and labour employed in that construction shall be binding upon the building owner and the builder.

A builder is a person whose business it is to provide, in the cheapest market, good labour and good materials, and to supply them and their results to the building owner at a reasonable profit, according to the directions in the drawings and specifications by which the architect expresses his decisions; this, and this only, is the legitimate province of the builder; who is or professes to be, bricklayer, mason, carpenter, smith, plumber, joiner, plasterer, painter, &c., all in one. Our epoch of *the division of labour* has seen all the trades connected, however remotely, with building combined in single hands, to the loss of all concerned except the capitalist; the good work of the present day is the bad work of fifty years ago.

The merchant knows what to expect, who orders an agent to make up an examined cargo of goods suitable to a particular market, which goods are to be furnished by a warehouse that does not keep many of them in stock, and has to manufacture, or get manufactured all the rest to order. This is the relation of the building owner, the architect, and the builder.

The merchant does *not* know what to expect, who orders that a cargo of goods suitable for a particular market should be shipped without examination from such and such a warehouse; the goods may be very good, but prohibited in the port they are sent to, or they may be legal, and of such a quality as not to pay for freight. This is the relation of the building owner and the builder, without the intervention of the architect.

The preparation of this paper has been caused by the fact that in my professional education and practice, during both which you have several times honoured me by your favourable attention, it has been my habit to examine, value, and repair buildings at their birth, prime, and decay; thus I have seen that old houses survive generations of new ones; that new houses are generally ugly; and when pretty are frequently not worth in the market what they cost.

The *Times* has called upon its readers to compare old London-bridge, faulty enough in design, but living for six hundred years, with Westminster-bridge, 1750, and Blackfriars-bridge, 1760, both now supported on crutches. The first of them is waiting to be swept away as a nuisance some day; the other may remain an invalid until the crutches rot and the fabric falls under the weight of a man, a horse, and an empty cart. This weight is fixed as the fatal one, because it has once been enough to break down a railway-bridge. There was no deodand, I believe, on the human body, but the cost of the other animal and the cart must have been paid by somebody.

The same comparison may be made with regard to houses. A work by the late Mr. Hudson Turner, which is still new, and called "Some Account of Domestic Architecture," is filled with descriptions of houses built at the same time as Old London Bridge, or earlier, and of houses built from that time to the year 1500, which are still standing. We need not recapitulate his list, but, acknowledging the beauty of nearly all his examples, we will take up the subject at the beginning of the sixteenth century, when brick was a fashionable material.

We shall find that a large number of the timber and of the brick houses that were built between 1509 and 1649, still remain, and command what may be termed a fancy price. There is actually no saying when they will perish; some in ruins like Tattershall are as good as many a new house of the present day. If we visit London just on the skirts of the great fire, we see houses that need not be pulled down, which is more than can be said of the London that has been built since 1800. To say nothing of almshouses dating between 1550-1650, we shall find that houses built before 1600 in the Strand, Little Moorfields, Cross-street, (Islington), Holywell-street, Gray's-inn-lane, Bishopsgate-street, were, till lately, or are now, existing. These are certainly not in very good condition, but we shall find houses 1620-30 in Lincoln's-inn-fields and Great Queen-street, 1637 in Chandos-street, Covent-garden, 1640-62 in Clare-market; 1657 in Middle Temple-lane, and 1660 in Hatton-garden.

Keeping generally westward with fashion we find 1678 King's Bench Walk, Essex-court, and Farrar's-buildings in the Temple, Arundel-street, Exeter-street, and Sackville-street, 1680 the Old Jewry, King-street, St. James's, Crown-street, Wardour-street, and Soho-square; Paper-buildings in the Temple, which Bagford says were so called from the slightness of their construction, 1685, were not rebuilt till 1848. So that actually houses built in what was then considered a slight manner, have lasted 160 years; indeed, it was lately stated at an inquest that a house was only 200 years old, and therefore could not have been supposed to be in danger; in fact, ought not to have fallen. This is a remarkable proof of the extreme difference between the old and the new houses; if we reflect that a glance through the journals of the last fifteen years will show the fall of about as many houses before they were finished, as of the old houses. Yet Neve, in 1703, says, "the greatest objection against London houses (being for the most part brick) is their slightness, occasioned by the fines (*or ground rents*) exacted by the landlords, so that few houses, at the common rate of building, last longer than the ground lease, *i.e.*, about 50 or 60 years, and this way of building is very beneficial to trades relating to it, for they never want work in so great a city, where houses are always repairing or building." And probably much of his observations applied only to houses on the outskirts of the then city, for we find that about that time good houses were built, as 1700 Red Lion-square, Bolton-street, Devonshire-street Queen-square, and Great Smith-street; 1707-8 King-street Golden-square, Queen-square Westminster, and Great Ormond-street; 1716 New Bond-street, Conduit-street, and Hanover-square; 1718 Rathbone-place; 1720, Bedford-row; before 1725, King-street Covent-garden; 1727, May Fair; 1730, Oxford-market, Half Moon-street, and South Audley-street; and 1737, Crown Office-row, in the Temple.

The age of these houses is clearly marked by the fact, that after 1708 the window sashes in London and Westminster were placed in reveals by order of a Building Act; fifty years afterwards a new Building Act was necessary from the great increase of buildings, and the order for reveals extended to some outlying parishes; in 1766, Parliament again met the great increase of buildings by a new act; and in 1774, came the stringent act called the Black Act.

About 1765, Berners-street and Grosvenor-place; 1770, Great Russell-street and Salisbury-street; 1775, Mansfield-street and Stratford-place; 1778, Portman-square, Portland-place, and the Adelphi were built. Many of these streets built 1760-1780, under vigorous legislation, and leases for 90 years, have houses that although old-fashioned, are handsome, convenient, and far too good to be pulled down. The very foundations of this Society's house are shown to foreigners, though perhaps few of my audience know that such a sight exists; except to those engaged in building it is an unpleasant and useless visit.

But with the year 1790, we have Lisle-street; 1795, the New-road; 1800, Alfred-place Gower-street, and Baker-street; 1805, Great Surrey-street, Wade-street, and Russell-square; 1810, Bryanston-square; 1815, Park-crescent; 1820, Regents-park, Burton-crescent, and Regent-street, or their neighbourhoods. Regent-street rubbish was a term well understood by the workmen employed on it, and Regent-street rubbish, for a great wonder, it remains. I counted upwards of 30 cracks in one wall of a house there. But bad as that is, it is not really so bad as much that has been since built,—it stands.

The public would seem to have a belief that a low rent and a good house, in a good situation, are likely to be put before it under the present system of competition. When the landlord was the builder, and covered four or five acres with houses, it was his interest to build all equally well—he could get his rent—but when he let that ground to four or more builders, they cut down the cost of construction, in order to compete with each other for profit out of the rents, which their own competition made lower than their landlord would have asked, and this system of competition is part of the secret of our present bad houses. The other part of the secret is the folly of people in renting or buying anything in the shape of a house, without knowing, or endeavouring to know, anything about it; yet the public will not hire or buy a piano in the same way.

The usual way of starting a street is to let the land to that anomalous being, a speculative builder. He need not be a builder, or a tradesman in any branch of building—indeed the persons whom I have known succeed best, were a sailor, who had succeeded to some property, and built two houses for £7,000, which he sold immediately, in the most careless, openhanded way, for as much each—a chandler's shopkeeper, who built a row of forty houses for £300 each, and sold nearly all of them, but none for less than £600—and a footman, who built a street in such a style that at last the tradesmen actually refused to work any longer for him, but who complacently said, in the court of law to which he summoned them, tenants would occupy anything he put up.

Between 1760 and 1810 many streets were built on a system which no longer prevails; it was called blood for blood; because if a plumber took a piece of ground, he arranged with a bricklayer, carpenter, joiner, and painter to put their work over the ground, each taking one or more houses finished with his plumbing in payment.

Of course his lead was thin; the brickwork was poor; the rafters and joists were weak; and the glass and painting discreditable.

From 1800 to 1825 there was a different system; builders who gave themselves up to the business of building streets on speculation, borrowed of their friends and tradesmen, and paid their debts according to the sale of their houses; this system dropped when the lenders found unfinished houses left on their hands. Since 1815 the timber merchants, &c., have lent money to the speculative builders, and of course the quality of the materials they supplied could not be disputed; but these persons, especially the timber merchants, have apparently had reason to suspect collusion between speculative builders and ground landlords; and are now more wary; indeed, the real speculator is often the landlord who lets ground and advances money, in the hope that the speculative builders would put a good deal more money of their own or other peoples in the shape of carcasses on his ground, and by failing would allow him as mortgagee to foreclose and get, at a cheap rate, carcasses to be finished scampishly and sold at an apparently reasonable price.

We see houses built before 1700, actually still too good to be pulled down when 170 years old, and most of them are considered good for another 40 years at least; we see many houses only intended to last for 100 years, new fronted, and these also are considered good for at least another 40 years; and we see many houses that were built before 1800, that are now being tinkered in order to last that time. But we also see whole quarters of London consisting of houses built since 1790, which the tenants quit from absolute fear; rows exist where the representatives of the builders would be too happy to get rid of their prospective burdens, and sell their interest or rather burdens in their leases, for a mere song.

Why our dwelling houses in London are built after one plan, viz., an entrance passage, a front room, a smaller back room, and a staircase by its side, is a mystery to many besides myself. The plan is no doubt a very good and healthy one, where it provides a thorough draft every time the back or front door is opened, but it has a great tendency to make the chimnies smoke, and to keep the house very cool in winter. Why, also, the kitchens should be placed in the basement is not clear; the open doors in summer carry all sorts of scents up the stairs. Indeed, in this respect the very small houses, like those in Camden-town, which have no basements, but have kitchens in the yard, might be usefully followed in larger houses, and the servants' rooms might be above each other at the back of the house, and all the way up. Some good third-rate houses have the staircase in front, and gain a handsome back room, at little expense to that in front, but this plan is rarely followed. It is also curious that speculative builders never will put a ventilator to the top of the staircase, and so the whole heated and damaged atmosphere of the house is poured into the top rooms, which also happen to be the apartments for the invalid and the nursery.

There is hardly a house fit for an invalid in London, yet almost every second house in a street contains, on an average, one invalid in a year, and all the year round. Perhaps this is one reason why so many invalids live abroad, where all their home is on one floor, and where there is only one staircase, and that a very easy one to descend, in order to get into the garden or the street. Back Houses, too, are quite gone out of fashion, as if our families had nothing to do but to sit at the front windows to see the passing vehicles. I was much struck, in several of the Belgian and French towns, with the system—of which traces may still be seen in the city, viz.,—of having a carriage entrance, in which a porter lives that stops all incomers to know their business. He and his wife act as servants, on occasion, to the inmates of the front and back houses. Through the carriage entrance I passed into a pretty, though small, garden, (I should say that no carriage except for an invalid entered,) which separated the front and back dwellings. In compliance with continental customs most of these were large enough to have a family or two on each floor, but I visited where only one family occupied the pretty little house. There the porter is answerable for your house; you put the key on your hook in his lodge, and the whole family can leave for the best part of a summer's day, week, or month, with safety. The convenience of this system to men living in chambers in London is so obvious, that it is surprising that families have not adopted it. The cost of one servant is at least saved, and nearly one-half of another is quite saved. The dust and noise of the streets does not affect the back house, and by letting the front one for business, the rental of the ground is much increased. There ought to be a stop put to the barbarous system of using basement floors as sleeping rooms, and for ovens. There is no occasion for the great part of our bread to be prepared in underground holes, where the baker's men can see nothing except by candlelight, and which are subject to all the dirt and effluvia—but I need say no more on that point. In the best houses in certain parts of London, the female servants are made to sleep in the basement. It was my business to survey a house near Russell-square the other day, and I found under the entrance passage, with a window looking (it would not open) into the enclosed shed under the steps, and a chimney place blocked up, a closet in which two servants were said to sleep. The fœtid odour was such as the mistress of the house apparently thought accidental, and she was good enough to explain to me that it arose, she thought, from the fact that her neighbour's cistern always kept overflowing and made one side of this little bed-room rather damp, so damp indeed that the plastering could not be said to stand upon the wall. To find sink-stones with the holes corked up is nothing new at home. Perhaps one of the greatest improvements in London houses of all sizes, would be to have the drains laid so near the surface, and so covered by boards in their line, that they could be examined or cleaned without trouble; at present there is nothing which embarrasses me so much on surveying a house. If the floors are taken up and the drains are clear, there is great wrath at the trouble and expense; if reliance is placed on the assertion that the drains are clean, it by no means follows that they are either clear or sound, and many a drain has been allowed to leak its contents away into the kitchen floor and the foundations, from which cause alone there are many damp walls in London.

I shall say nothing about a backwardness in adopting patent sash-fastenings, calculated to render the labour of cleaning the windows less dangerous; or sensible designs for stove grates; or speaking tubes; or ventilating glass in the windows; or self-fitting lock handles; or small rooms fitted up for a bath or baths, where children might upset the bath without injury to the house as is frequently provided abroad, especially in the north of Europe; or the possibility of making a house so nearly fireproof, even if it be an old one, that lives should not be lost in case of fire; or of better shutters, than the ugly contrivances now in use; or of lifts, or of several other things equally useful and valuable; yet these are all matters which are neglected in our houses, of the common as well as of the better sort; and I am inclined to think that it is because an architect is not employed. Perhaps we might go further, and say that if an architect is said to be of no use except to increase the cost of a house by the amount of his commission, at all events an amateur, or a speculative builder would certainly be sure to do better. You know that the new streets of London are filled with houses that have little or no real convenience in them, and that the speculative builder does not seem to care a jot for the sanitary and social improvements of the day; but you probably do not know the sort of faults committed by those men who, loftily saying, "we can do without an architect," think themselves clever enough to direct their tradesmen. Houses without staircases, as in Harcourt-street, Dublin; without a front door, as at a house in Liverpool; without a door to the drawing-room, on which occasion my father was called in by a client who became my godfather; without light to the stairs, which is common; or virtually cut in half, as by a military engineer, are absurdities seldom believed but oftener perpetrated.

As to competition, the matter is still worse. The public decides that it wants a cottage, a shop, a house, a school, a parsonage, or other buildings, of which it fixes the price. On what grounds it fixes that price nobody can say; yet the public, knowing nothing of the price of a building, appoints a committee to spend this sum in a satisfactory building: whether the committee, or a private person, wants the house, &c., the following steps are the same. A child who has to choose between a large plain cake and a small pretty cake, would ask if they were equally good; but the public expects to have its cake the biggest and prettiest at the same time without security as to whether it is good at all. So it advertises a competition.

Where a lawyer, a medical man, or a broker, is wanted, the public can be tolerably safe in seeing if the name is on the rolls or lists of the respective bodies corporate, but, when the public requires the services of an architect, it accepts as one any person who chooses to take the title. Of course, in these days of competition and free trade, an architect on the rolls has no right to complain, either that he is not employed, or that a person not on the rolls is employed; but the vexatious part of the business is that, if the public employs what the profession calls a quack, and is deceived, robbed, and ridiculed, it unjustly says, "What is the use of an architect?"

Knowing the desire of the public to have its cake large and pretty, men calling themselves architects engage in competitions, and send the biggest and prettiest designs that occur. He who sends the biggest and prettiest is generally successful. Does the public believe that the apprentices and clerks of architects are capable of answering the purpose; if so, it is as much in the wrong as if it asked a chemist's apprentice to take off a limb or tie an artery. Yet one half of the competitors are pupils, clerks, or young men without experience; now, the public has no right to depreciate a whole profession because the apprentices are incapable. A large number of the competitors are civil engineers and builders, men estimable no doubt in their own lines, but no more fitted for such competitions than they would think an architect fitted to direct the water supply of a town, or to take a contract for the bricklayer's work of a public building. Does the public believe that the biggest and prettiest cake offered to its acceptance at the price named, is likely to be good in its constitution? A single judge might be so uneducated, but half-a-dozen or a dozen can hardly be so far wrong. This is the dilemma, either ignorance or injustice chooses a cake made so pretty and so big that it cannot be good.

To avoid this dilemma for public buildings, the employment of an architect as judge is the only course to adopt, and has been adopted in some cases; but the judge may well say that his is a thankless office, when as has been the case, he has conscientiously to report that not one of the designs sent in by the men who call themselves architects, can be done for the money; or give the accommodation required. Then the Committee generally throws aside the award, and makes a choice of its own.

It may be said that this is all very true of a committee, but that an individual is always equally unfortunate. This, however, can be justly and emphatically denied. If a private person employs no architect, his building may be whatever it will; if he employs the first packing-case maker, gardener, painter, undertaker, auctioneer, who calls himself an architect, let his building take the consequences. Ellesmere-house, Holford-house, of the present day; Burlington-house, Marlborough-house, of the past, are equally fine buildings, built by selected architects. The club-houses are generally built by competition, but amongst selected men only, as was the Royal Exchange; and at Liverpool the most sensible of the speculators offered handsome prizes to competitive designs for his new street houses. I shall say no more of architectural competition than that the principal leading architects do not enter unlimited competitions, unless justified by the importance of the occasion. Thus, in the approaching competition for the Government offices, the public will not have the advantage of the skill of half-a-dozen of our best men; and thus, also, but a few established names of repute are attached to the forty-six sets of drawings now exhibiting at King's College for the Constantinople Church.

The case of a private client with a selected architect is, as I have said, a very different one to that of a committee. Some persons complain that the client names beforehand the price which he will pay for the building that he wants, and thus confines the taste of his architect. On the contrary, the restrictions which the peculiar wants and wishes of the employer dictate, should form the pressure to make the fountain of genius play high.

Few buildings, it may be presumed, are now built under such circumstances as the East India House. It would appear that the Chairman said to the architect of the Company, Mr. Jupp, "We want a house, tell us how much it will cost." Mr. Jupp made his design and estimate, which were approved by the Board, excepting as to the front. The Board offered that subject, not the whole work, to a limited competition, I believe, or, at all events, chose another architect to design it. Mr. Jupp executed the work for less than his estimate, and the Board paid the amount, with the addition of a gratuity to him of £1,000. Such a gift was not singular in the last century, but now, we say, the more important the work the less we will pay for it in proportion.

In many cases the architect is not the offender who causes a house to be ugly—but the want of education in the client.

Frequently a good design is cut down, to save some trifling expense, and after the contract is made with the builder, one alteration after another is made by the client, the contract is void, and the bills for extras when added to the amount of the amended tender often greatly exceed the sum that would have completed the original satisfactory design for the house. It is easy for a client to say that he will make no alterations; but when a work is begun with the sole object of parsimony before the mind, one of two things happens. If there is an architect employed, beauty and utility are sacrificed to convenience and strength, the meagre starved design does not come up to the expectation of the proprietor and his critical friends, and before and after completion as much is spent in various attempts to improve the house as would have sufficed at first to make it right; but even then the building always betrays its sordid origin by its mean features, which can hardly be effaced; the unhappy architect loses his credit, and as the house will, perhaps, not fetch half its cost, the disappointed proprietor loses his money, when even a speculative builder would have known better. If there be no architect, the usual result, indeed, is that ornament, not beauty, is put on to the building at the expense of the materials and labour; the proprietor has saved the cost of an architect, and has sunk his money in a house that will frequently not sell, and will want repairs three or four times as often as a good ugly house, and those repairs will cost at least as much as the original price of the house, being immeasurably more than the value of those required for an ugly good one.

When we begin to consider the cost of a building, we find another difficulty in store for committees. The cake, reduced in size and shorn of its ornaments, is put out to tender, and the committee is puzzled by the result. The figures I produce are tenders actually made within the last two months:—

2,800	757	400	252
2,600	740	371	247
2,492	695	356	232
*2,234	* 558	* 319	* 186
2,198	531	314	177
2,197	530	313	177
2,194	520	312	173
2,112	486	301	162
2,005	470	286	157
9) 20,832	9) 5287	9) 2972	9) 1753
*Average... 2,315	587	330	196

Fifty more examples of this sort of competition are at your service; there can be no hesitation in saying that the average of these would have amply remunerated any respectable tradesman: the highest amounts perhaps arose from too expensive modes of proceeding, from the expectation of large profits, and in some cases from mistakes; the lowest ones certainly arose from mistakes or intention.

If the committee prides itself on honesty, and paying no more than a thing is worth, but still wishes to pay the fair value of the building, what choice can it make in such tenders? There is an outcry if it does not take the lowest. If the difference arises from a mistake, the builder generally withdraws his tender on hearing of the large difference; but if he is in a hurry to begin, the committee may expect to have either continual quarrels, or to hear of the builder's bankruptcy with a demand from his assignees for the most extravagant value that can be put upon so much of the work as is done. A committee, by accepting such low tenders, also gets into the difficulty of spending eventually much more money than it intended. It chooses the biggest and prettiest cake which it learns that it can have for its money, and finds afterwards that it is certainly a large and good looking cake, but of flour and water only; that the other ingredients are wanting; that the building, when paid for according to contract, and perhaps not too well built for the money, will cost as much more to finish before it can be used; a result which several asylums and similar buildings have presented to their subscribers, owing entirely to the ignorance or injustice of their committees.

If an individual attempts to build without the assistance of an architect, he is liable to the same misfortune; and the quarrels which arise are amongst the nicest pickings for the barristers that can be given them, by judges who dread having to sit for several days over a case which consists of a builder's bill.

The usual way of settling a disputed account for building, is to measure all the work and pay the current price for it. This would be the honestest way of dealing in all cases, if all work were equally good and were done under similar circumstances, and if the current price could ever be strictly ascertained. It is admitted, too, that this "measure and value" system, still retained by the Government, was open to gross frauds, and that it is in want of revision; many prices still asked are those for which the best work was formerly done. Amongst other duties I have had to value bad work, and I can only liken the difficulty to the trouble of settling the precise value of adulterated food.

The great objection to building by unrestricted competition is, that it gives the best chance to the worst man, to the man who intends to break his contract or to defraud his creditors.

But no human system can be entirely free from imperfections and disadvantages. Both committees and individuals are obliged to announce that they do not bind themselves to accept the lowest tender.

If called upon to name a better method, I should feel inclined to recommend the plan of taking the first, second, or third, as might be previously settled, *below the average of tenders made*, for we so often see our respectable builders classed together in the middle of such a list of tenders, that it is evident their prices were tolerably near the truth. At all events, they are the builders to whom I should apply in a limited competition, and no doubt there are several gentlemen, themselves builders, in this Society, who will tell you that it is not worth while to compete, except under limitation, *i.e.*, that you cannot expect to get good work by an unlimited competition.

In order to build cheaply, the speculative builder, or the bad builder, resort, or connive at a system of scamping, which, if the work be executed under an architect, keeps every one connected with the building in a fever of quarrel: and which, if it is not executed under an architect, may be a great deal worse than the following picture of things which you may see daily if you will stop and look at the new houses on the outskirts of London.

The soil is perhaps clay, at first with no great drain near it; as soon as a large sewer, or a very hot season comes, the foundations of the house sink a little and the walls crack considerably. Or the soil is mere dry rubbish, and the house gradually sinks into it; this would be of less importance if the house could keep upright while sinking; or if the soil be good, the foundation, that is to say, the bottom courses of the brickwork are merely bits of stone and brick lying in a mass of mortar.

Lumps of old brickwork carefully built into new walls, and old road pavement, are not the worst materials now used for walls; indeed, in themselves they are jewels compared to the bricks, which, instead of ringing like a bell under the strike of a hammer, crumble under the pressure of a strong hand or the touch of a light hammer.

As for the mortar, it is not much better than the bricks; it ought to be made of newly burnt lime and river sand; but the lime is allowed to spoil before it is used, and the sand is sea sand or pit sand, or road sand, road drift, or road stuff, or the actual earth from the site of the premises; all these have the slight defect of either introducing vegetable rot into the new house, or of preventing the mortar from becoming hard; if good lime and sand are used, instead of being made by hard manual labour into a mass, having each particle of sand covered with a coat of lime (as to keeping it mellow, that is now never thought of), they are mixed by boys and drenched, often with foul water, for immediate use, and the mortar is supplied to bricklayers, who are engaged either by the piece or by the day: in either case it is their business to get as many bricks as they can to look laid. I have heard a man threatened with dismissal by a foreman for not laying half as many bricks again in a day as are allowed in the price of labour for fair work. Often when the bricks are good they are sometimes so dry that the water is absorbed out of even well-made mortar, which dries into a powder. But in general our bricks are porous enough, without this additional fault; and you may always suspect this is the case when there is a rush of air into the room at the skirtings: this is healthy, and consequently ought not to be altogether stopped. You will observe that when new brickwork has bits of old brickwork in it, the new settles down a good deal in the first three months, but the old has no settlement to make, so there is a crack on each side of it for some distance. Even where I have been watchful, advantage has been taken of my absence to finish a good piece of foundation with rubbish (and I have been personally threatened for persevering in having it taken up), or to put rubbishing concrete instead of stone paving; in the latter case the building owner desired me not to interfere, the foreman had told him it was safer, and cost more than the stone. Bricks are laid now-a-days with a bed of mortar, roughly smoothed out, when the bricklayer takes up a little on the trowel, wipes it off on the edge of a brick already laid, and puts the next brick in place with as little exertion as possible; when this little bit of mortar has perished, the air circulates in the wall in a manner that is advantageous to our health, but decidedly inconvenient and annoying, and the house wants what is called pointing, of which you all understand the nature, expense, and trouble; in fact, the house requires painting and papering after it. But these are not actually germs of danger sufficient to cause the house to be pulled down; they may cause alarm to the inhabitants, but danger *is* real when the soil alters its condition, when the bottom parts of the wall turn up on to the kitchen floor, when the walls and piers bulge out in the middle of their height, when the walls begin to overhang, when the bricks in the arches of the windows begin to drop out like teeth; in any of these cases I would recommend you to apply to a real architect, and if he should say, "Go out," I would take the advice if possible. Sometimes indeed, we hear of a few wedges being lightly driven into cracks, with the advice that the tenants should "go" if the wedges fall by their own weight out of the cracks when the cracks get larger. Some persons are so strong-minded as to sleep without further precautions in such a house: others have some one to sit up all night and watch the wedges; but I recommend that little bells, or, better still, detonating balls, should be fixed to the wedges, because the old nurse or watchman might go to sleep as well as the rest of the family.

A building may be really dangerous, yet give no sign of the fact to most observers. A house may appear very dangerous without there being any real cause for its demolition. I suspect that we borrowed from France or Germany the system of tying one or more houses together with iron rods, which announce their existence by a sort of coal-plate fastened on the outsides. This affords an object for decoration, which has not yet been treated successfully in London, but abroad these plates (which are technically called anchors) are full of significance and loveliness of form and grace of design, to which the beauty of colour might be added.

Among the little defects of the public, I am inclined to place the notion that an architect should be able to say whether a house is in danger or not by simply looking at it. Some architects certainly have an apparently instinctive appreciation of real danger, as some physicians can foresee apoplexy; but the medical man gets the aid of the tongue, the pulse, the stethoscope, and a statement of the internal feelings,—the architect is generally allowed, like the Eastern physicians, to see the skin of his patient, but not to touch it. There is, perhaps, no outrage upon domestic comfort and private property more resented than the sensible attempt of a surveyor whom the public may employ to examine a house. Does he want to see if the roof and chimnies are sound; there is no way out to them except through a hole big enough for a child, but scarcely for a man, and if he puts his head through, he generally sees that unless he means to risk his neck, he had better send for a long ladder and get up outside. The connexion between long ladders and broken slates, and the consequences, are familiar, of course, to many present. If he wishes to see that the floors are sound, and wants to have a board in each floor removed, it would seem that he had done an injury to one of the family; or if the house be empty, and he tries to see what sort of bricks are behind the stucco or plastered front of the walls, the landlord watches him as he would a thief; but the great explosion of wrath is caused by a hint as to the foundations and the drains; in fact, the surveyor who goes that length had better be a man able to control his temper. Yet all these are points on which a prudent man ought to be satisfied before he takes a house for seven years, and much more before he buys house property.

Fortunately, however, there are other indications of the state of the health of a house, and I will liberally put you in possession of some of the principal ones. If you walk over a house and find that the walls are cracked or damp, that the paperhangings are changed in colour, that the floors shake, that the stairs creak, that the doors and windows have not fitted, then you may be sure that you are among the elements of a haunted house, and that you had better not enter it again without professional advice. I run no risk in this liberality, for people are found to take houses with a clause that "no dancing is allowed on the premises." We all know cases where the supper has been demolished by the ceiling, and now we go to houses where the ground and first floors are propped up on the occasion of an evening party, though *no* dancing is contemplated.

But neither the public nor professional men can tell without experience the signs of premature old age in a house. When it was young, the heedless, speculative builder had caused the walls to be run-up, and a bricklayer knows full well the meaning of that word. He put their footings on the wet ground, with no lead, or slate, or asphalte soles; he put no area round them, but wrapped them up with wet clay (or, perhaps, he put an area under the clay, as is sometimes rather uselessly managed); as to the chimney-stacks, they are, probably, as usual, only skins of brickwork, enclosing flues and those vast holes for the reception of red-hot soot, which set so many houses on fire; the arches of the windows and door-openings are, probably, only shams; and, as to the exterior cornices, let the coroner's inquests tell how they are made. Rotten paving-stones are laid, off their balance, on the wall, and are to be kept in their place by a load of parapet, until the day when some one steps off a ladder on to the cornice, either for repairs, or in case of fire, or until a new proprietor removes the parapet in the course of alterations and improvements. Then, perhaps, there is a large amount of what may be called hereditary disease in the house. For example, the carpenters employ sometimes decayed old stuff, and exhibit their forethought of using no more of it than can be helped, by putting that stuff at distances a quarter larger than is generally allowed for new and good materials. Of course builders who will do that will not hesitate to do without a girder or a main beam, if possible, or will put a couple of joists to represent it, and will put unseasoned brestsumers to carry the whole weight of a front upon story-ports that will bend, literally bend, under the weight of the brestsumer, before the brickwork goes upon it at all; or will carry a whole house upon little iron columns, which are so small that they act like bradawls, and cut at top and bottom into these walls, which, of course, leads to settlements. As to partitions, so slight that we must not lean against them until they are lathed and plastered, but so framed that if a tenant wants to cut a doorway in them he cuts the one piece of wood which holds the whole together, I am inclined to deem them less prejudicial than roofs, heavy enough in appearance, but of decayed or unseasoned wood. I must not, however, fail to give to our modern carpenters in London the credit of making two new joists, or two new boards, out of a single old one. At Brighton, however, they can, and do, get three floor boards out of a single old one. It is, perhaps, rather unscientific to use the half-joists in the present way **V**; they would, undoubtedly, be stronger if laid **Λ**, but then there would be nothing to nail the boards upon. The joiners are certainly to be pitied who are sent into a house to put their slips of dry wood into the crevices between each pair of floor-boards that have shrunk, and to make the skirtings fit close to the floor; but it is generally considered best to remove the doors which not only have their panels split, but are so twisted that when they are shut at the top a rule may be passed near the bottom. A very usual cause of gradual and unseen decay in a house is the roof. The small-sized slates split and let the water in, and are laid so badly that the water gets in if they do not split. They are fastened with iron nails that decay and let the slates slip and cut the gutter, which is either of zinc or lead, and in both cases too thin, and so leaks; the junction of the slates with the walls is puttied up with cement, which cracks and lets the water in; the gutter is not deep enough, and overflows; and the rain-water pipes are so small that they easily get stopped.

The fall of ceilings is not always a mark of danger; the plasterers have covered the partition and ceiling timbers so liberally with laths, that there is no room for the plaster to be pushed between them and turn over, so as to make what is called a key, which in fact is to fasten it to the laths; it will not stick of itself to the laths for any length of time if there is the slightest tremor in the house—children playing in the room should be taught that if they are very uproarious the ceiling may tumble upon them, as in the case of a school lately. The great quantity of water used in making the mortar for plastering, kept a house very damp for some time formerly; but now the drying is forced by braziers full of charcoal in each room; habits of tape and rule, and a deplorable want of scientific knowledge, invariably put a brazier under the flower in the centre of the ceiling; the room becomes very hot, the flower and mouldings begin to crack and perhaps to fall, whilst cracks of infinite variety as to shape and magnitude appear on the ceiling and the walls. That is to say, this happens only when the doors are left open, for many people shut them, and the charcoal fire goes out soon afterwards. In a few days the plastered walls are so many fields of blisters, arising from the badly burnt lime in the mortar; but this passes unregarded, for the painter and paper-hanger have yet to come.

The painter attempts to disguise all defects with paint and putty, but as the work is done in a damp house, every patch and spot of the knotting or covering of the bad wood, and of the nail holes filled with putty, can be seen through the finishing coat of paint—the paint, however, is to blame partly, for it has hardly been paint at all in the old sense of the word.

The paperhanger is equally unlucky; he does his best, I suppose, to get the joints of his papers to match, but it tries the temper to see a good red flock paper with a white line at each joint, and to see half the colours disappear just because the papers were hung before the plastering was quite dry. When that is the case it is usual to see if the grates have not got rusty and so stained the chimney pieces; that stain nothing that I can name will remove.

But what does all this matter? We see along our suburbs whole rows of houses unfinished or partly finished; when the plasterers begin their work, an inscription says, " This desirable (or this excellent) family residence to be let," and Karswilliams Lodge is actually let in time to allow the board to be used for the next house—and so on along the row.

Our forefathers were usually so short-sighted as to lose a year's rent, by waiting so long before they painted and papered, and the medical men seem to think that a damp house is not so safe to sleep in as the wet plaids of which we have heard. But the house is taken; let the tenant look to the rest, because, after all the trouble of moving furniture, perhaps new, a fire is lighted for the first time and in the best room, probably to receive the bride on her entrance to home. You may imagine her exclamation when she ventured into the drawing-room, and was straightway saluted by what Bulwer felicitously terms a joyous dance of those monads vulgarly called smuts or blacks; you feel indignation at the bridegroom who exclaimed to the choking servant that he had to go to the city, and rushed out with the blacks tumultuously following him to the gate, one yard from the door-step. The money value of the fretting, and fuming, and worry, and care, consequent upon the discovery that a chimney will not draw, may be calculated; but when half-a-dozen chimneys rebel, the sum is beyond belief—of course the clouds of smoke that rebelliously will not roll up the chimney, but prefer going out by the door or the window, are endured in the hope that when the chimney is dry, all will be right, but in the mean time the ceiling, the paper, and the paint get discoloured, and the tenant must have no fire, or go to a chimney doctor. This functionary, generally a white wizard, engages to unbewitch the chimney with a patent top, good in some cases on principles which he does not understand, and when at last the patient victim will try no more tops, he gets as a parting blessing the hint that perhaps there is a brick too much, or perhaps a brick too little, in the chimney.

A guileless and uneducated portion of English householders living in London, also appears to have a belief that all these points fall under the notice of the district surveyor. He is to be paid, the Act of Parliament says, and of course he is to do something for his money. Several district surveyors could tell you that they are often expected to do for their fee of shillings, as much work beyond what the act requires, as an engineer would charge guineas for. It is desirable that the fiction of every Englishman's having a knowledge of the laws, was in this case a fact; the district surveyor's duty is simply, on the part of the State, to watch the building owner, the architect, and the builder, and to see that they do not, from ignorance, carelessness, wilfulness, or misapprehension, transgress certain rules laid down in the Act.

If the public expects that any architect can possibly see every brick laid, every heap of mortar made, every piece of timber cut, every slate laid, in short every thing done, it makes a mistake which should be rectified. It might as well expect Mr. Rowland Hill to weigh every letter that passes into the Post Office.

If the public will avail itself of unlimited competition, and will not pay the builder a fair price for his work, the class of honest builders will die out, and in all our houses we shall see one or more faults like those which I have just described, without the least exaggeration, and for most of which proof can be found in the newspapers of the day, and for one or two of which, taken separately, proof will be found in the experience of my audience, or of their friends.

Thus are houses built to be sold, and the question arises can any better houses be built under the present system of competition?

It is want of education, and also fashion, which allows the public to rent or buy any such houses at all, and which allows the builders to erect such houses; and, as the attention of the Society appears to be especially turned at present to popular education, I hope that these observations, on points which are not thus treated in any book, will be acceptable, as giving some insight into those most useful, but too much neglected, portions of knowledge as regards a dwelling. It is supposed by the public that, because all ornament has not been set aside, economy was not a great object with the speculative builder. This is a great fallacy. Where absolute *parsimony* is required, all ornament must be set aside, but when *economy* is the object, ornament is frequently requisite, for the desire to have some decoration in his dwelling is usual, perhaps inherent, in man; and speculative bad builders know the fact so well that they think rightly it is economical to spend some of the money saved by bad construction on decoration. Thus the graining or imitative painting is an effective investment of capital. There are few eyes to which colour is not attractive, and an empty house, decorated in the best taste, if that be a simple one, is not easily let. It seems necessary to hang gaudy papers, and to paint the woodwork in imitation of oak and maple. The moment the house is furnished this effect disappears; the spots of gaudy paper that appear among the furniture are obtrusive and uncomfortable; as for the woodwork, nobody sees whether the imitation be good, bad, or indifferent; and there only remains the varnished marbled paper of the staircase—that is economical, because the colour is desirable as giving an air of comfort, and spots of dirt are supposed to be part of the pattern. There can be no faith in the cleanly habits of people who put up a varnished paper on the staircase. The question of *sham*, as it is now generally called, is intentionally avoided this evening: it is enough for my purpose to say that the imitation for doors, shutters, and skirtings, of woods that cannot be afforded, is generally a profitable investment of capital, like most of the other deceptions by which we keep up appearances—deceptions which are regarded by some earnest persons as offences less against good taste than against morality and political economy.

At first sight it would seem that the investment of capital in houses is a speculation to be recommended, either to a person wishing to purchase a residence for himself, or to a person having a little money to invest. For suppose the sum to be invested is £1,350, and he decides to build for himself by unlimited competition, he may get the following tenders, (which have really occurred,) £1,497, £1,445, £1,325, £1,298, £1,198, average £1,352. If he takes the lowest tender he saves £150 that he may fund at 3 per cent., and this will give him back his £1,200 in 70 years. Perhaps he lets the houses on lease, and avoids the repairs; but if not so lucky, he can usually manage to pocket three years' rent in seven, and if content with a clear profit rent of 7½ per cent., (instead of 10 generally asked,) he fancies that he sees in 35 years £1,350 in rent, without reckoning compound interest, and the houses to sell, and the £412 made by his original saving, and you will say that a house ought to clear more than three years' rent out of seven. But it does not, somehow, if it is not a well built house.

On the other hand, if the £1350 had been spent, the builder would only fancy that he saw in 35 years £1,350 in rent, without compound interest, and the houses to sell; for such houses will fetch no more rent from a sensible public than the bad ones in the same street; it must drop its rent to the £90, which its competitor can afford to take.

Is it in human speculation to resist these results. Whom does it hurt? Why should the builder be forced to spend the extra £150 on each house or set of houses.

The policy of honesty in building only shows itself after a time.

Every year of a badly built house may be said to cost at least one-third of the rent in repairs; if they are not done the house goes to ruin at once, and many persons have not more spare money than that which they have invested; several such houses require that a man shall have capital, and the speculative builders generally have little or none.

Our modern houses are so badly built, that even respectable builders now find it difficult to sell a lease, and can scarcely get any one to take a 7, 14, or 21 years lease; people begin to see the advantage of taking a house upon trial, and a three years agreement is the consequence; at the end of that time so much is wanting to the house, that the trouble and expense of moving is balanced by the inconvenience of having workmen in the house, and by the discovery that not far off there is another new house to be let for three years, decorated after the latest fashion.

In seven years the £1,200 houses will have demanded the outlay of £180, but the £1,350 houses nothing: and supposing that neither have let, the truth gains at once. In fourteen years the £1,200 houses will have cost £360 in repairs, but the £1,350 houses perhaps only £90. In the first fourteen years the £1,200 houses may have luckily produced £540 clear; the £1,350 houses are hardly likely to have lost more than three tenants, and would then have produced £990, so that the balance on the side of good building at the end of fourteen years is—£990 — 90 = 900 against £540 + £150 and interest, or £900 less £765 = £135 more than the bad building gives.

It is quite true that at the end of the first seven years the rents may fall equally, but the proportion of profit will alter in favour of good building.

The great damage that a bad house does to a good one in the same street, or near it, is to reduce the rents and the market values to the same level. All houses have suspicious characters in the eyes of a purchaser at auctions. But when 35 years have expired, the £1,200 houses will not be so good, with all the money spent on them, as the £1,350 houses, and at the end of 70 years, if not much sooner, their value will have perished, but the £1,350 houses will fetch about as much in 35 years as at present.

And society is interested in the question. Although the saving apparently of the £150 is considered, there is a loss to society of £720 on the £1,200 houses, but the repairs of the £1,350 houses are only a loss of £382, so that society loses to the individual £338 on every £1,200 spent in bad building. I leave the importance of this subject to yourselves.

Speaking of honesty, I must not omit to mention that the speculative builder has a great advantage over the private building owner in the discounts allowed by the trades, which allow him to sell his building, *while finishing*, at prime cost; whereas the private owner has to pay his builder that "prime cost" and a profit, and in large works probably the amount paid to the architect for looking to his interests, before he can sell, and therefore he cannot afford to sell at builders' prices; if he attempts to sell by auction, the scamped work of the speculating builders has ruined his property before he finished. But if he can hold the property, he can beat the others by his honesty.

Thus I have shown you the various characters and difficulties of the building owner, either as a committee or as an individual—of the architect as an agent, whether professional or quack—of the builder, as a monopolist and a tradesman—and of the speculative builder. I have shown you the situation of many of our old London houses according to their age, and you can see their duration as well as myself. I have shown you most of the chief defects that exist in modern buildings, with many of the causes of their early ruin. I have shown you how if good, their cost, at first, is extravagant to the building owner, but if bad, a good investment at the moment to the speculative builder; and I trust that I have shown you that if the systems which I have condemned are continued, no blame for faults of construction or want of beauty in our buildings can justly be attributed to the members of the profession to which I have the honour to belong.

DISCUSSION.

Mr. Robert Rawlinson said, that in all ages and in all countries houses and house accommodation had influenced the morals of a people as much as, if not more than, laws and teaching. Let them read any of the sanitary reports published of late years, such as those on Plymouth, Dover, Portsmouth, Penrith, and others, where it would be found that the poor and working classes generally were crowded into single-room tenements—parents and children, and lodgers, males and females, without any means of separation. Thus vice and immorality grew with a child's growth, and strengthened with its strength, inculcated by "example," which "prevails when precept fails," so that schools for vice were far more numerous than schools for virtue, and teachers of vice far more diligent than teachers of virtue. How, then, could a few short lessons in school eradicate the ingrained evil. How could temporary reformatories, in a few short months, eradicate a taint which was generations old? Schools were necessary, and it was proper to establish reformatories, but education must begin at home, and from the cradle; and that it may so begin, the poor must have proper house accommodation provided. There must be a chance of virtue given to all; there must, therefore, be means of separation of the sexes. The duty of providing or of superintending such accommodation ought to devolve on parish and municipal authorities. Gaols were built at great cost,—upwards of one hundred pounds a cell. Workhouses were built for paupers. By our negligence vice was allowed to produce criminals for our gaols; and by our negligence disease was allowed to produce paupers for our workhouses. To interfere beyond what was now done would be termed "centralisation." Model lodging-houses and model dwellings had done good, and would do more good; but individual efforts would never overtake the existing national evil. The remedy must be national. At present civilisation might be compared to a slumbering volcano—vice pervaded the hidden stratum upon which the fair outside rested. A little smoke at the summit, with here and there clinks and cracks at the sides, served to show the fire beneath. All was fair above; all was unstable and terrible below. Civilization, in the spirit of Christianity, would be the only safe remedy. Houses must be improved; all other reforms would fail if this reform remained neglected. Buildings in London streets, especially in the new West-end parts, were as like each other as peas in a pod. Like had begotten like with a vengeance. Neither the Chinese nor the Japanese ever repeated themselves more than our modern builders had done; and one of the worst features about such houses was that the better they were the worse they were. A West-end Terrace or Square house was so well constructed as not to admit of ventilation; the walls were solid, as per Act of Parliament, and all the parts were so perfectly fitted as not to admit fresh air, which could only be obtained by ventilation; hence, their perfection of workmanship was an evil, unless combined with scientific construction.

Mr. Ashpitel said the paper of his friend Mr. Papworth had been very slightly directed to the subject which had lately occupied a great deal of attention, viz., the dwellings of the poor. The paper rather treated of the larger descriptions of dwellings in and about London, and therefore he feared it would be somewhat confusing the subject to mix up one with the other. With regard to what were termed respectable dwellings, it would hardly be denied that within the last thirty or fifty years the quality of those houses—notwithstanding that materials of every description were much cheaper, and although the Legislature had removed the duty upon bricks, glass, timber, and other articles used in building, and had done much with a view to get better houses—yet it could not be denied that the houses were infinitely worse; and it was a fact that vast numbers of houses built prior to the year 1700, and let perhaps at rentals of £100 a year, were worth more years' purchase than houses built twenty or thirty years ago. It was unpleasant to speak of his (Mr. Ashpitel's) own profession, and to argue that in these cases a competent architect should be employed to look after the buildings, and to see that they built good houses. It was, however, a very extraordinary thing with regard to buildings, that it was almost the only branch of trade where an individual in a matter of business trusted wholly and entirely to another whose interests were diametrically opposed to his own. As soon as it was known that a person was about to build upon an extensive scale, there was a number of persons immediately ready to "earwig" him, as it was called. They would say, "what is the use of having an architect; the owner had much better do without, and save the five per cent." There was magic in that saving of five per cent. to a capitalist. The same remark applied also to the subject of repairs. It was one of the strangest anomalies of the day— that men should be found to place implicit faith in the saving of five per cent. by the non-employment of an architect. Let them take the case of a man who was going to lay out £10,000 in building; he would higgle with an architect to obtain his services at four per cent. upon the outlay, and was it to be wondered at that men who entered upon a matter with so narrow a spirit should become a prey to those whose interests were opposed to their own. Let them look at what was doing in France—let them compare what was doing in Paris with the best work about London. There were honourable exceptions, no doubt, and amongst them he might mention the late Mr. Cubitt, who, although to some extent perhaps a speculative builder, yet always did his work well. There were, however, millions of money spent in the metropolis, and they saw nothing for it compared with what they saw in the sister metropolis of Paris. In the latter city it was justly considered that there must be a union of education with practice—the union of the long study of the artist with the experience of the man of business. What had been lately done in Paris threw London into the shade. The money expended in building in Paris within the last three or four years was probably not one-hundredth part of what had been spent for the like purposes in London, and yet they saw to what advantage it had been laid out in the former city. That city was now beginning to claim pre-eminence over the renowned Italian cities. The Rue de Rivoli was shown to the foreigner as a work which could hardly be matched in the world. The system had operated frightfully with reference to the poor. The building of the dwellings for the poor in this country for many years past had almost entirely fallen into the hands of the lowest class of what were called scamping builders. They ran up buildings which looked well outside for a little time, but which soon let in wind and water through the walls and roof, having been put up with an utter disregard to the health and the morals of the persons who were to inhabit them. He thought a great deal more might be done with regard to the dwellings of the poor than had yet been accomplished. The different inventions that had come before them from time to time, for warming, ventilation, and other sanitary matters, which he could not now enter upon, had been woefully disregarded. These questions had, he was aware, been taken up by several gentlemen now present, and he hoped he might be allowed to say to some extent by himself. A very peculiar task had devolved upon him lately. Near to him was a district inhabited not by the poorest class, but by skilled labourers, men earning from 25s. to 30s. and 40s. per week. There was more difficulty to house those people than any other class. What were called the £10 houses were not adapted for them; and to get self-contained houses for those who could afford a higher rent was a matter of difficulty. Look at the £10 hovels in London, and there was nothing better to be had until they got to £28 or £30. This necessitated the taking of a house and cutting it up into lodgings; and there commenced one of the great evils of the present system. He had been working at this problem for a long time, and had hoped to have done something towards its solution; and if Mr. Rawlinson would fulfil his promise of bringing this subject before the Society he (Mr. Ashpitel) would feel the greatest pleasure in placing what few facts and figures he was in possession of at that gentleman's service, and he believed some very interesting results would ensue from it.

Dr. Arnott, F.R.S., said the paper had not taken up, as he had anticipated, this painfully-interesting and important subject, in a sanitary point of view. This being the case, any observations he could offer would lead the meeting into a different field of discussion. He expressed his gratification at the offer of Mr. Rawlinson to take up the sanitary consideration of the question, and when that time arrived he (Dr. Arnott) would be happy to express his opinions upon so important a matter to the community at large.

Dr. Waller Lewis said, the author of the paper appeared to object—with a professional feeling which they could all understand—to competition amongst architects for building houses or large public edifices. He had no doubt that the system of competition, like all other human schemes, had its defects. But he was inclined to doubt whether the converse of the proposition would be found to be true, that all buildings intrusted to architects, even of first-rate reputation, without competition, would be erected as they should be. He was conversant with most of the large public offices of the metropolis, and with many of those of the provinces, but he must say that many of those edifices, built under the direction of architects of first-rate reputation, and, as a rule, without competition, were designed without any regard to the health, comfort, or convenience of those whose ill fate it was to inhabit them. A very important edifice that he was in the habit of visiting constantly, had been so planned, that the air and light appeared to have been most jealously excluded from all the parts where these were most required. A short time ago, he had inspected a large provincial government office, upon which, he was informed, upwards of £15,000 had been recently expended in repairing and improvements, under an architect of repute, and although nearly 100 officers were employed there, while numerous gas lamps were pouring out their injurious emanations to be inhaled by the men, no measures whatever had been taken to remove the foul or to supply fresh air. Thus, if there were evils attached to the system of competition, as stated in the paper, there was no certainty that a building entrusted to any picked architect would be erected as it ought to be; yet in these public buildings no expense was spared. There was one edifice he would point to in which competition amongst architects had been found to pave the way to a great evil, he meant the New Palace at Westminster. When that building was contemplated, competition for designs was invited, a certain amount of money being named as the cost, which was not to be exceeded. Very many architects sent in their designs, which were exhibited in Westminster-hall, keeping strictly in view the amount intended to be spent in its erection. Others, however, paid no attention to that point, and upon the principle of unlimited expenditure they were, of course, able to furnish more magnificent plans than those who kept within the limit of expenditure laid down. This, he thought, was a breach of public morality which ought not to be unpunished. Architects who inspected the various designs for the Palace, perfectly well knew that many of them could not be carried out within the limits of expenditure assigned, and most probably their designers were perfectly cognisant of that fact. The most beautiful design certainly was selected, but would any one say that the terms of the understanding as regards cost were attended to? Now he (Dr. Lewis) contended that the plans on that great occasion ought to have been within the limits assigned for competition; and there seemed to be some immorality in sending in beautiful designs which could not be carried out for double or treble the amount stipulated; and he believed if Parliament had been made aware of the ultimate cost of that edifice, they would hardly have sanctioned so enormous an expenditure. He thought one reason why architects were not more generally employed in giving plans for houses, &c., than they were, was that, as a body they overlooked social and sanitary arrangements in a manner that could hardly be expected from gentlemen educated as they should be in all things. It was of the highest importance that all buildings should be well ventilated and well aërated. Good food was of great importance to the health of a people, but air was more important than food, inasmuch as they could live two or three days or longer without food, whilst they could not live a quarter of an hour deprived of air. And yet this seemed to be the last thing studied, or rather, a subject not studied at all by architects. In many of the public buildings with which he was acquainted the ventilation had only been an afterthought, and was therefore badly contrived—in fact, a makeshift. The paper contained many points of interest and importance, and one practical matter was alluded to in the fact of smoky chimnies where an architect had not been employed; but he might be allowed to state that he had lately visited the house of a nobleman, upon which £5,000 or £6,000 had been expended in alterations, and after they had been completed, under the directions of an architect of the highest eminence, almost every chimney in the bed-rooms smoked so much that it was impossible for the family to light fires in those rooms. This occurred entirely owing to the faulty construction of the new roof. He, therefore, thought it was partly the fault of architects themselves that they were not more generally employed than they were. The question, however, in which he felt the deepest interest had been but lightly touched upon in the paper. That was the erecting of proper and healthy houses for the poor, but that was not a subject which could be discussed in a part or even the whole of one evening. He hoped Mr. Rawlinson would not delay the paper he had promised on this subject. The speaker then alluded to his recent visit to Paris, where he had remarked the desire that was evinced on the part of the government to improve the dwellings of the operative classes, but one great impediment to that movement was found in the fact that it was inexpedient, on political grounds, to congregate any considerable numbers of the working classes together in one locality. It was on that account that the "Cités ouvrières" were not encouraged by the authorities in that magnificent city. Happily no such impediments to the march of improvement in this respect existed in this country. They knew of no instance in which the concentration of the working classes in healthy homes had originated any political disturbances, and they had no fear of any mischief of that sort. On the contrary, he believed that the very opposite effect would be produced by giving the artisans of this country more healthy and therefore more happy homes. He had very strong hopes that the government would take up this subject as the foundation of all moral and social improvement whatever, not only as regards their own *employés*, but also as a powerful incentive and example to wealthy manufacturers and other owners of property to "go and do likewise."

Mr. Elliott said that it was no easy matter to obtain for the public that most useful of all things, a good house. Houses around London and other large places were built on land held for 60 or 90 years' lease, a fatal evil, for people did not like to invest their cash and care on that which would in the end be taken by another. Hence, a house, which ought to be built in the most solid and endurable way, was manufactured of the worst materials, and put together so that it might just stand over the term of lease and then tumble down. To alter the tenure of land in this country was almost hopeless. It was, therefore, almost hopeless to obtain dwellings that were safe, comfortable, and wholesome. The public would not be protected against knavish builders by the mere employment of architects; there were knaves among them, and many fools, who would conspire with the builder to rob the public. Ignorance was a greater enemy to good houses than knavery—architects and builders were alike destitute of common sense—and there was a club-house in the City where some most instructive and astounding blunders had been made, such as would hardly be pardonable in a house built by the sons of Noah. Perhaps the most ready way of relieving the public from the stupidity and rapacity of builders would be by writing a small tract, indicating the things that were proper for a good house—a sort of house-hunter's *vade-mecum*—and it would be a most economical use of public money if there were, at some public place, say the Museum of Economic Geology, a series of models of houses, giving plenty of choice, say six of each, at prices, say—£500, £1,000, £1,500, £2,000, £3,000, £5,000, or thirty-six models. There was desire enough on the part of the public for a good house, but the public knew not what they really wanted, and they required instruction about houses as about all other things; and, going even further than that, the outside of a row of houses or a street was public property, and, while the inside must be made convenient, the outside must be made to subserve structural beauty. If men took away fresh fields, green hedge-rows, and luxuriant trees, they must be constrained to put up graceful façades. For all this a strong government was indispensable, which would and could compel obedience to regulations so connected with the people's health, comfort, and enjoyment. The only really ornamental and luxurious architecture in this country was to be found in our prisons, as at Holloway and Reading, or our asylums and reformatories, as at Colney Hatch or Redhill. If the humanity-mongers had only bestowed as much care on the homes of honest workmen, as they had done upon the palaces of thieves and paupers, we should have had something in domestic architecture to be proud of.

Mr. Winkworth said that he did not rise for the purpose of discussing the general question so ably opened up by Mr. Papworth, but to confirm, from his own knowledge, the statements made by Dr. Waller Lewis, as to the residences provided for the poor at Paris. He had had the honour of an audience of the Emperor in 1854, at the instance of this Society, it being part of his business to obtain the assistance of the French Government towards providing economical accommodation for such English artisans as might be disposed to visit the Exhibition of 1855; and he had therefore previously acquainted himself with the existing facilities for that object. Amongst others he was shown over a large building in the Faubourg St. Antoine, which was being fitted up for the accommodation of about 300 persons, under the direction and at the risk of a society, nominally French, but principally composed of well-known English philanthropists, which building contained every appliance necessary to comfort (cuisine, dining-rooms, and plenty of water,) but one, viz., drainage. In conversation, however, with his Majesty, and M. Fould, le Ministre d'Etat, and Mr. Clark, the representative of the company, it soon became evident that the want of this cardinal desideratum was deemed of comparatively small importance, the objection to the building, as an ultimate residence for French workpeople, being, as Dr. Lewis had hinted, a political one. It was thought dangerous to have so large a number of operatives under one roof, especially in so revolutionary a locality, all which was rather implied than said in so many words. In the course of the conversation his Majesty produced a diagram of a large vessel, to be moored in the Seine, opposite or near the "Annexe" to the Exhibition, and asked him (Mr. Winkworth) whether, if fitted up as proposed, it would suit our workpeople. He was obliged in reply to point out the fact that, being below the level of the road, and the means of ventilation being necessarily imperfect, and also taking into account that in August, when the visits would probably take place, the heat would be very great, he feared that our people would hesitate to avail themselves of the proposal. His Majesty then said that they had already arrived at the same conclusion, and were glad to find their views confirmed. Returning to the immediate question, Mr. Winkworth then went on to say that on subsequent visits to Paris, he had seen other houses in the Batignolles fitted up for the residence of operatives, free from objection as to size and sewerage, which were fully inhabited, and he had reason to hope that the mass of persons dislodged by the destruction of so many houses to form the magnificent street alluded to by a previous speaker, probably the finest in the world, viz., the Rue Rivoli, would find much better accommodation in the vicinity of Paris, with all those modern conveniences which were essential to health, comfort, morality, and content.

Dr. Milroy remarked that as the paper had not embraced the sanitary part of the question, upon which Mr. Rawlinson had promised a communication to the Society, he had but few remarks to offer upon it. The first thing which struck him on coming into London, some 25 or 30 years ago, was that in a city where space was more valuable than in any other city in the world, so little advantage had been taken with regard to the height of the houses, by which means space was obtained equivalent to superficial area upon the surface of the soil. He, however, found that this matter was beginning to be attended to, as was observable in the more recent erections in the city and other business localities, where the houses were run up to a height before unattempted. In rural districts, where space was of less value, this became a matter of less importance, but it was paramount in crowded and thickly populated localities, and where also a great consideration was to have the labouring population located as near as possible to their places of employment. In cities abroad, such as Paris, Geneva, and other places, this matter was particularly attended to, and coming as he had done from Edinburgh, he was particularly struck with the contrast afforded in most parts of London, to the lofty buildings in the latter city. The other matters calling for attention in connection with this subject, were a proper water supply and good drainage of the houses, but the chief point he would notice was that the space to be gained in lofty buildings, had hitherto been so much neglected in the metropolis and other large cities in this country. Great economy would result from a change in this respect.

Mr. Pearsall thought this Society might prove a valuable medium for diffusing the information which had been suggested by Mr. Elliott. He alluded in terms of commendation to the measures taken by many large employers of labour to provide dwellings for their workpeople, instancing the case of Mr. Titus Salt, of Saltaire, and Messrs. Ransome and May, of Ipswich.

Mr. Sparkes Hall said he had tried, on a small scale, the plan alluded to by the last speaker, but it had failed in the object contemplated from the fact that it was at too great distance from the locality where the people worked.

The Chairman proposed the thanks of the meeting to Mr. Papworth, for the able paper in which he had that evening opened the subject of house construction. Within the time allowed for the reading of a paper it was impracticable to have introduced more than a portion of the subject. If, from the prominent part given, most usefully, to the fraudulent insecurity of construction of houses as they are, it had been intended to imply that the main object should only be to ensure the solidity of construction of houses as they were, the attention of the meeting would have been occupied to little purpose. The cases of loss of life from falling houses, from the visible and attendant circumstances, made strong public impression, but measured statistically, as he (the chairman) had been accustomed to measure the operation of causes, when he could obtain the means, the cases of death from those visible causes—the want of solidity of construction—were absolutely only as units to the thousands of cases of disease and death, and dangers, from invisible causes, arising from defective arrangements in the most solid constructions. Chemically speaking, houses as they were, scarcely less than houses as they are (except accidentally), might be called inverted receivers of the invisible and poisonous products of decomposition, from invisible cesspools, from invisible and permeable drains of deposit, which acted like the neck of a retort, to which the old sewer of deposit commonly served as a bulb. To these invisible products were added those arising from the vitiation of the air by breathing, by combustion, and by other operations. The regular action of the buildings as inverted receivers was only prevented during the day, partly by the opening of doors and windows, and often by the permeability of the structure, by reason of the defects noted in the paper read, but at night, when the doors and windows were closed, the shutters shut, and the window curtains drawn, the action of houses, as they were and are, might be tested by the sense of smell of those who first entered them, from the fresh air in the morning. Houses as they were had no merits in this respect, and in them the noxious operation of these invisible causes was only mitigated by greater accidental dilutions, greater space and, in the mansions of the highest class, by less crowding. Even the palaces of royalty had not been exempted from these evils. Even in the new palace of the legislature, after all the expenditure upon it, a chairman of committees had been almost stunk out of his chair, by the products of decomposition, emanating from an evaporating surface, of upwards of one hundred ordinary cesspools left at its basement. Now, however, new standards had been arrived at, which served for the measurement of the extent of loss and danger arising from the invisible products of bad arrangements in construction. To these standards public attention could not be too seriously or too constantly directed, namely, the various model dwellings. In some of these dwellings the death rates were reported to be as low as eight in a thousand; in various others the death-rate had kept steadily, year after year, at little more than thirteen in a thousand ; the death-rate common to the particular class of occupants living in dwellings as they were and are, being generally thirty in a thousand; the death-rates of the general population living in the immediate vicinity of these model dwellings being twenty-seven in a thousand; and of the whole population of the metropolis, high and low, in open and close districts, in houses as they were and are, being twenty-two and twenty-three in a thousand. The model dwellings were only models in the abolition of that poison-pit, the cesspool, in the abolition of the old permeable brick-drains of deposit which required cleansing, and were, in fact, extended cesspools—in the substitution of an improved water-closet or soil-pan apparatus, and of improved tubular drains, which, when properly adjusted in respect to size and fall, required no cleansing, and insured the immediate and complete removal of all excreta from beneath the sites of dwellings, before they can enter into any of those stages of decomposition in which the noxious gases are evolved. These new dwellings were only models further, in these points—that there was some regular ventilation provided, though imperfect; that in their management, overcrowding was prevented, and that water, though not of the quality which a proper administration would insure, was carried, as a means of cleansing, into every tenement; that there were proper sinks for the immediate removal of all foul water, and dust-bins on the outside, whence the contents were regularly removed, shafts being placed over them to carry away effluvia. Such arrangements had now been extended to large numbers of old houses as they were and are, without any change of the population, and with the like results, the almost total abolition of typhus and other epidemics. He wished particularly to note, that these results had been achieved by house drainage alone, or by drainage within the precincts of private premises, and independently of any alterations, viz., the general sewerage works. He noted this because ignorant, or interested and mischievous efforts, had been made to divert the public attention from house drainage works and from the removal of cesspools from beneath houses, to questions of general sewers and general outfalls, which could only be properly adjusted when the new house drainage works were completed, and which, if executed independently, would not alter the death rate. This might be proved from instances where new sewers were provided, but the houses themselves remaining unaltered, the heavy death-rate still continued. The most important practical result obtained at the recent Congress of Bienfaisance at Brussels was the corroboration of the standard achieved in this country, of the death rates obtainable by improved structural arrangements within houses as they ought to be. The delegate from Cologne had stated, that whilst the houses in that town immediately surrounding the model dwellings were ravaged with cholera and typhus, the inmates of these had an immunity from the epidemics. The delegates from Holland, Turin, and German towns, attested similar results, which had been previously arrived at by the examination of the causes of the disease, which showed that little less than one-half of the general mortality of populations was preventable by structural means. In his (the chairman's) report on the general sanitary condition of the labouring population of Great Britain in 1842, he had reported a general extension of the average of their lives to be practicable. In what had been done in the varied instances to which he had referred, and others which he might cite, he claimed the practical realisation of that promise. Now what did these standards prove was due to the condition of houses as they are in the metropolis? A loss of more than twenty thousand lives, and a reduced duration of the period of life and health and working ability to all who lived in them. To the nation at large the loss was not less than one hundred and seventy thousand lives per annum. It was a subject of greater national importance than any foreign wars, for from what external enemies could we be in danger of such loss of life? It was really of greater importance than any question of political liberty, for what political slavery was there now to fear under which little children would be decimated, or worse than decimated—under which more than one-third would be slaughtered before the expiration of their fifth year, as in the metropolis, forty per cent.; in Manchester, forty-seven per cent.; in Liverpool, upwards of fifty per cent.? The political strength of a nation was dependent on its industrial prosperity, and its industrial prosperity on the amout and duration of the bodily strength and working ability of its population; and what political question was really so great as the one which involves the duration of the working ability of every adult workman by ten years or more? He was glad to hear the unanimous response to the suggestion—that distinct questions of sanitary construction might be brought before the Society, and he was happy to have ground for the hope that those questions would be treated with the anxious attention commensurate with their vast importance,

A vote of thanks was passed to Mr. Papworth.

The discussion, having lasted to a late hour, was terminated without Mr. Papworth being called upon for any remarks in reply.

The Secretary announced that on Wednesday evening next, the 22nd inst., a Paper by Dr. R. Angus Smith, of Manchester, "On Disinfection," would be read.

PHOTOGALVANOGRAPHY.

In June last, the Council awarded to Mr. Paul Pretsch, late manager of the Imperial Printing Office at Vienna, the Society's Medal for his "Application of Photography and the Electrotype to the Production of Engraved Copper-plates for Printing," termed by him Photogalvanography.

The Emperor of Austria has lately presented to Mr. Paul Pretsch the Grand Gold Medal "For Arts and Sciences in Recognition of the Artistic Perfection of the Specimen Prints which Mr. Pretsch has submitted to his Majesty."

NEW ZEALAND FLAX.

The following notification is made in the New Zealand Government Gazette, of Dec 24th, 1856.

Colonial Secretary's Office, Auckland, December 20th, 1856.

The Government of New Zealand is prepared, subject to the undermentioned conditions, to give rewards to the amount of £4000, for the discovery of efficient means for rendering the Flax, and other fibrous plants of New Zealand, available as articles ef export, viz:—

£2000

To the person who shall, by some process of his own invention, first produce from the *Phormium Tenax*, or other fibrous plant indigenous to New Zealand, one hundred tons of merchandise.

£1000

To any person, other than the person entitled to the first reward, who shall, by some process of his own invention, next produce from the *Phormium Tenax*, or other fibrous plants indigenous to New Zealand, one hundred tons of merchandise.

£1000

Viz.:—£200 to each of the first five persons, other than those entitled to the first and second rewards, who shall by any process, whether of his own invention or not, produce from the *Phormium Tenax*, or other fibrous plant indigenous to New Zealand, twenty-five tons of merchandise.

The merchandise must be saleable as an article of export from the Colony of New Zealand, and have been produced at a cost not exceeding 75 per cent. of its value at the port of entry from which it is exported; and the process used must be fully made known with a view to the discovery being at once made available to the public.

His Excellency the Governor of New Zealand will from time to time appoint Commissions, to consist of not less than three persons, to act at such places as circumstances may require, and each claim for reward will be referred to such Commission as may be considered the most convenient for its proper investigation. The acts of the majority will be deemed the acts of the Commission.

Each Commission shall be at liberty to adopt such means as it may deem most fit for determining the value and cost of production of the merchandize, for ascertaining the process employed, and for fully investigating in all respects and reporting upon the validity of any claim.

Every claim for reward must be preferred in writing before the 1st January, 1859, to the principal officer of Customs at the port of entry nearest to the place where it is desired that the examination of the merchandise shall take place, who will at once proceed to ascertain whether the full quantity in respect of which the reward is claimed, is ready for examination, and if such quantity is ready, he will give a certificate to that effect, dated on the day on which he shall have ascertained the fact, and such day shall be deemed to be the day on which the merchandise was produced.

Whenever any officer of Customs is required to go more than three miles from his residence, his travelling expenses must be paid beforehand by the person requiring his attendance, and he cannot be required to attend a second time if the quantity was found deficient on the first occasion.

One-half of any reward will be paid at once to any person whom a Commission shall report and the Governor shall have determined to be entitled to the same—after which no other claim to the same reward will be entertained—and the other half upon satisfactory proof being given to the Governor of the *boná fide* sale of the merchandise in Europe, at an advance of not less than 20 per cent. upon the *boná fide* actual cost of the article landed in Europe.

By His Excellency's command.
E. W. STAFFORD.

PREVENTION OF ACCIDENTS IN CONNECTION WITH SCAFFOLDING.

The following remarks and suggestions, for the prevention of accidents in connexion with scaffolding erected for building purposes, or for the repair or restoration of Cathedrals, Churches, Music-halls, and other interiors, are earnestly recommended to the attention of architects, engineers, builders, masons, painters, decorators, plasterers, and others:—

It can hardly be doubted that many of those painful occurrences termed "Accidents," which so often end in the loss of life or limb, and bring desolation and poverty into the homes of the working classes, are really not the result of inevitable circumstances, but arise from the absence of common precaution, and may not unfrequently involve a large amount of culpability. Acting under this impression, and with an earnest desire, for mere humanity's sake, to lessen, if possible, the number of casualties (whether to workmen or to individuals passing below) which occur in connexion with building and repairing operations, the writer, who is a disinterested party, suggests the adoption of the following precautions:—

Rope-nets, of a three-inch mesh, and strong enough to resist any pressure likely to be applied to them, either by men or by materials, should be made in pieces 24 feet in length by six feet in width or depth, at the corners of which, as well as at every three feet distance on the edges, should be securely placed stout galvanised iron rings, through all which should run a rope to make the net or nets fast to the upright scaffold poles, on which should be fixed somewhat stouter rings, or cleats, for the like purpose. The net (formed, if necessary, of several pieces united) should be drawn quite close to the front of the scaffolding, and be shifted from time to time, so as to form a sort of gallery, wherever work might be going on.

Nets of similar strength and dimensions* and furnished with rings, exactly as above, should also be drawn close under the loose foot-boards, the outer edge of the underguard thus formed being fastened to the lower edge of the front or upright net by a rope passing through the openings in the nets and through the iron rings, at each of which latter the rope might be half-knotted for additional security. A rope should be also passed through the rings of the inner edge of the under-guard, and be made fast to some column or beam, or other part of the building itself.

When the foot-boards are bolted or otherwise fixed down to the ledgers or cross-supports, the under-guard might be dispensed with, provided the boards and supports are all perfectly sound, and the front-guard well secured close to the scaffolding.

The front net, with another net attached to be drawn under the scaffold boards in use, might be suspended from pulleys fixed to short projecting arms or cranes at the top of the scaffolding, so as to be easily swung free, and be shifted up and down whenever necessary; care being always taken to secure the front net to the upright poles and to draw the under net quite home, either to the inner scaffold poles, where used, or to the building itself.

It is suggested, also, that the upright or front net should be carried round the ends or sides of the scaffolding, so as to form a sort of gate for the passage up of workmen or materials.

For underguarding wide-spread scaffoldings, put up for the repair or decoration of Cathedrals, Churches, Music-halls, or other spacious interiors, especially in the case of roof or ceiling operations, as many nets as might be necessary should be laid on the ground, edge to edge,—(and if they were all of uniform size,† with rings at three-feet distances, &c., they would fit and unite easily,

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*** For "under-guarding" street scaffolds 12-feet lengths might be more convenient, and they would fall in very well with the 24-feet nets. Tarpaulins or canvass-sheetings might be used, if preferred.**

† The suggestions for using rope-nets for front guarding and underguarding scaffolding appeared (without details) in the *Builder* of the 22nd November, 1856, besides being alluded to in a subsequent number of that paper; and they appeared in detail in the *Building News* of the 16th January, 1857.

and several parties to a contract could join their nets)—and a rope, of the same gauge as the nets themselves, should be laced in and out, to unite the various pieces firmly, the rope being half-knotted at each ring for additional strength; and the whole being raised in convenient portions and secured close underneath the scaffold boards. Thus any number of nets could be joined, and the largest floor of loose boards rendered comparatively safe. The edge of the scaffolding, wherever exposed, could also be "guarded" by carrying the upright nets along it, and making the rope passing through the top rings fast on each side of the building; the net being stiffened by the insertion of a few upright struts of wood or iron into the foot-boards or lateral poles, or by a line carried to a higher part of the scaffolding or building.

Were the precautions here recommended generally adopted, it is believed that not only would many accidents to the operatives themselves, whether from their own heedlessness, from the use of decayed or defective boards, from stepping back to view their work, or from what are familiarly called "bricklayer's traps," be prevented, but additional protection would be afforded to persons working or passing below, whether in the street or the edifice, against injury from the fall of planks, bricks, implements, &c.

The writer also desires to call attention, without alluding to particular recent accidents, to the necessity of a distinct understanding, in all building and repairing operations, as to the individual, whether the builder, or his foreman, or other party, responsible for the strength and proper construction, in a word, adequacy, of any scaffolding; and also to the question how far buildings might be erected from the inside, and external scaffolding be dispensed with.

Upon or immediately under all scaffoldings covering the footway, especially in London and large towns, a tarpaulin or guard of other impervious material should invariably be placed to prevent the fall of bricks or other articles, as well as annoyance to passengers from dust, &c.

PRINTING MACHINES.

Mr. Charles Knight, one of the Jurors at the Paris Exhibition, in his Report to the President of the Board of Trade, on Class XXVI.,* makes the following observations in reference to Printing Machines :—

" I have alluded to the printing machines of France, in which several important improvements have been applied to the principle of the cylindrical machines in common use in England. In the Paris Exhibition several machines, offering the advantages of more perfect inking, and of preventing what is called ' setting-off,' showed that the attention of the French printers had been more directed, than with us, to the practicability of producing the finest work by the machine instead of by the hand-press. Some of our artists, who have watched the dependence of the wood-engraver upon the printer, have long been of opinion that the equal operation of the cylinder is superior to the irregular force of the hand-press. But the heads of our printing establishments have generally considered that the cylindrical machine was only calculated to save labour, and not to produce fine work. Our machine-makers have, therefore, made various labour-saving machines upon the principle of flat pressure, which, as it is the principle of the hand-press, at which the most expensive work was produced, was thought to be the only principle for a more perfect machine. The French, on the contrary, have turned their attention to the perfection of the cylindrical machine; knowing that it had natural advantages which could not be obtained by flat pressure. When a sheet of paper is brought into contact with an inked surface of types, by being laid flat on that surface, a large volume of air has to be expelled by the heavy platten operating at once upon the whole surface. The cylinder, on the contrary, touches the type and produces the impression upon the paper, line by line, and there is no atmospheric resistance to be overcome. The French printers have, therefore, sought for the improvement of the cylindrical machine. The single-cylinder machine of M. Dutartre produces work which cannot be excelled by the most careful operations of the press. It prints only on one side, and the ' form ' passes under a double set of inking rollers, at each end of the table, before it receives the impression. In the double-cylinder machine of the same inventor, a waste sheet of paper is interposed so as to prevent ' setting-off,' and thus both sides of the paper may be printed at once, without leaving that blurred impression of one side which so commonly disfigures machine printing. The French printers now do their finest work by the cylindrical machine, and much of their common work by the hand-press.

" I think, upon a candid examination of the average work of the French printers, that, on the whole, it is superior to that of the English, as regards the evenness and clearness of the impression. The use of improved cylindrical machines has much to do with this. But there is another cause of inferiority not so easily to be overcome. Our paper is inferior, taking the general quality of printing paper. It is not made of so good material as the French; and although, considering the difficulty of obtaining good material, the manufacture has been greatly improved, yet an English sheet of paper has not that substance and surface, without which the most careful printing cannot be effective. The paper-duty, compelling the use of expedients for keeping down price, produces that delusive article of commerce which, bleached, sized, and glazed into a sheet of white paper—a product of much rubbish and little rag—is rotten or harsh—has one rough side and one smooth—resists ink, unless saturated with water—has to be vamped up again, after printing, with rollers and hydraulic presses; and, when formed into a book, requires to be handled with a tenderness that presupposes books not made for use."

Home Correspondence.

LODGINGS FOR WOKKING MEN.

Sir,—The lodging-houses alluded to at your last meeting are undoubtedly models of comfort, but they cannot be afforded by any but first-rate artificers. Hence it was that I conceived an inferior description of lodgings (described some years ago in the *Builder*), but which at the same time afforded suitable accommodation for a family consisting of boys and girls, with their parents, as well as, subsequently, dwellings of the lowest grade. In both of these provision was made for warming and ventilating them, though each family was to receive food from a common kitchen. This plan was invented by Sir Samuel Bentham, for workmen's houses at Sheerness, and though not presumed to be perfect, still it may afford hints to others as the means of ensuring cleanliness, warmth, and ventilation. Part of these plans differs from any others, in that the entrance to each lodging was from an external gallery, a circumstance that seems essential in point of health and comfort, as when they are connected any workman's contagious malady is likely to be communicated to the other inmates.—I am, &c. M. S. BENTHAM.

26, Wilton-place, S.W.

Proceedings of Institutions.

Bucks and Berks.—The Public Examination of the Bucks and Berks Lecturers' Association, notice of which was given last autumn, will be held at the Mechanics'

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* Drawing and Modelling, Letter-press and Copper-plate Printing, and Photography.

Institute, Sheet-street, Windsor, or Saturday, May 2, commencing at two o'clock, and concluding at eight. The prizes will be divided into two classes—I. For the members of Institutes and Reading-rooms. First prize £3; second, ditto, £1. For this class the examination will embrace all the subjects of which notice has already been given. II. For the members of Night-schools and Village Evening Classes. First prize £1 10s.; second ditto, 10s.; third ditto, 5s. For the second class the examination will be specially limited to the following subjects:—Reading, elementary arithmetic, writing, the outlines of geography and of history. N.B.—Candidates will, however, be at liberty to make choice of the class of prizes for which they will prefer to compete. It is requested that the names of all candidates be forwarded to the Rev. E. Hale, Eton College, on or before the last day of April.

London and South Western Literary and Scientific Institution.—The seventh annual general meeting was held on Thursday, February 26. Mr. F. J. Macaulay in the chair. The report of the committee states that the usual fortnightly (winter), and monthly (summer), arrangements of lectures have been continued. The former has proved very popular and successful. The attendance has been such as rendered it incumbent on the committee lately to reconsider the internal arrangement of the building, with a view to increased accommodation. In this they were fortunate enough to obtain the assistance of the President, through whose interest, kindly exerted with the Directors, they have been enabled to make such an addition to the lecture-room, as will in future afford every accommodation for still larger audiences. As regards the summer arrangements, the committee, on referring to the experiences of other Institutions, are not surprised that, despite the high character of the lectures provided, the attendance has not been so numerous as during the winter session. They will still, however, endeavour to continue the summer course. The committee have pleasure in announcing a very handsome donation of books from Messrs. Smith and Co., of 186, Strand, and the library is now in a much improved state. The progress of the two drawing classes is very satisfactory, but the committee regret that similar success has not attended other branches of the Institution, in consequence of which they have discontinued the chess class, French class, and vocal music class. The evening school continues in active operation, and is well attended. The average number of boys present during the last year was forty. The abstract of the accounts shows that the receipts for the year ending December 31st, 1856, were £166 0s. 10d. The school account shows the receipts for 1856 to have been £50. The following gentlemen were then elected as officers for the ensuing year:—Lewis Crombie, Esq., President. A. Morgan, Esq.; J. Beattie, Esq.; A. Scott, Esq.; W. F. Godson, Esq.; and J. M. Thorne, Esq., Vice-Presidents. Mr. F. J. Macaulay, Hon. Secretary and Treasurer. It was also resolved,—That the thanks of the members be given to the Directors of the Railway Company, for their continued interest in the Institution; and that, in conveying this resolution to the Directors, the President be requested specially to notice their late act of kindness and consideration in improving and increasing the internal accommodation of the building.—Resolved: That the thanks of the members are hereby given, by this meeting, to the President and Vice-Presidents, for their co-operation and support during the past year.—Resolved: That the thanks of the members are hereby given, by this meeting, to Mr. F. J. Macaulay, for his services as honorary secretary and treasurer. —Resolved: That the best thanks of this meeting be given to Messrs. W. H. Smith and Son, for their handsome donation of books.—Resolved: That a cordial vote of thanks be given to Messrs. Waterlow and Sons, for their very liberal terms in regard to the printing for the Institution.—Resolved: That the thanks of the members be awarded to the Managing Committee, for their past year's services.—Resolved: That Mr. T. Hawkins is eminently entitled to the best thanks of the members, for his continuous support of the Institution, and that they be conveyed to him by the unanimous vote of this meeting.—Resolved: That this meeting desires to record its sense of Mr. Pratt's valuable services to the Institution during the past year.—Resolved: That this meeting has much pleasure in recognising the value of Dr. Halle's services, as Master of the Evening-school. The meeting, after a vote of thanks to Mr. Macaulay, for his conduct in the chair, then separated. The winter session was brought to a close on Thursday evening, the 9th instant, on which occasion Mr. James Howe (of the choir of Westminster Abbey) gave an interesting and amusing entertainment, entitled, "Music and Musicians." The lecturer was ably assisted in his vocal illustrations by Miss E. Lyon, and the Misses Howe, Messrs. Buckland and Hill, all of whom contributed greatly to the enjoyment of the evening. The lecture-room (which has recently been enlarged and improved at the expense of the Railway Company, who continue an active and generous interest in the Institution) was well filled. In concluding the proceedings of the evening, Mr. F. J. Macaulay (the Hon. Secretary of the Institution, and Chairman of the Committee of Management), after expressing the pleasure derived by the Committee and members from the evening's entertainment, addressed the meeting on behalf of the Committee. The proceedings then terminated with every expression of satisfaction from all present.

MEETINGS FOR THE ENSUING WEEK.

Mon. London Inst., 7. Mr. T. A. Malone, "On Photography; its present condition and most important applications."
Architects, 8. Mr. Ashpitel, "On the different Theories respecting the Forum at Rome, particularly those of the Commendatore Canina." Part II.
Chemical, 8. I. Prof. Strecker, "On a new Alkaloid existing in the juice of flesh." II. Prof. Bloxom, "Some remarks upon the juice of flesh." III. Mr. J. Horsley, "On the Analysis of Urine."

Tues. Royal Inst., 3. Mr. J. P. Lacaita, LL.D., "On Italian Literature—Origin of the Italian Language—Early Writers."
Syro-Egyptian, 7½. Anniversary.
Civil Engineers, 8.
Linnæan, 8. Prof. Owen, "On the Characters and Subdivisions of the class *Mammalia.*"
Pathological, 8.
Statistical, 8. Mr. S. Brown, "On the Statics of Fire Insurance."
London Inst., 3. Mr. E. W. Brayley, "On Mineralogy and Crystallography."
Royal Soc. Lit., 3. Anniversary.
Society of Arts, 8. Dr. R. Angus Smith, "On Disinfection."
Geological, 8. Mr. J. W. Salter, "On a fossil Crustacean from the Lias Bone." II. Prof. Huxley, "On a fossil Crustacean from the Carboniferous Strata." III. Prof. Ramsay, "On the Geology of Strath, Isle of Syke."
Archæological Association, 8½.

Thurs. Royal Inst., 3. Prof. J. Tyndall, "On Sound, and some associated phenomena."
Antiquaries, 2. Anniversary.
Royal Society Club, 6.
London Inst., 7. Mr. T. W. Burr, "On the History and Instruments of the Royal Observatory at Greenwich; and of other celebrated Observatories and Instruments, with the principal discoveries made by their means."
Numismatic, 7.
Philological, 8.
Royal, 8½.

Fri. Royal Inst., 8½. Prof. A. E. Ramsay, "On the Evidences of Peculiarities of Climate during the Permian epoch."

Sat. London Inst., 3. Prof. Robert Bentley, "On Systematic Botany, with especial reference to the natural systems of arrangement."
Royal Inst., 3. Prof. E. Frankland, "On the Relations of Chemistry to Graphic and Plastic Art."
Royal Botanic, 3¾.
Medical, 8.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, April* 10*th*, 1857.]

Dated 9*th March*, 1857.

676. James Denby Lee, Shipley, Bradford, and James Crabtree, Windhill, Calverley, Yorkshire—Improvements in power looms.
678. William Tytherleigh, Birmingham—Improvements in the manufacture of bullets and shot.
682. Edward Cook and James Stokes, Birmingham—Improvements in certain parts of metallic bedsteads.
684. Frederick Simpson, Redhill, Reigate—An improved mode of forming a screw in the necks of bottles, jars, and other similar vessels.
686. Carl Heinrich Julius Wilhem Maximilian Liebmann, Fartown, Huddersfield—Improvements in the purification of water, and the preparation of materials requisite for the process. (A communication.)
688. William Edward Newton, 66, Chancery-lane—Certain improvements in steering apparatus for ships and other vessels. (A communication.)
690. James Garth Marshall, Leeds—Improvements in machinery for preparing flax, hemp, China grass, and other fibrous substances.
692. William Henry Barlow, Derby, and James Samuel, Great George-street, Westminster—Improvements in cast iron sleepers for railways.
694. Frederick Alexander Fitton, Ardwick, Manchester—Improvements in certain machines for preparing, spinning, and doubling cotton and other fibrous substances.

Dated 10*th March*, 1857.

698. William Charles Day, Strand—Improvements in portmanteaus.
700. James Hamilton, Rochdale—Improvements in coating iron and other metals with metallic substances.

Dated 11*th March*, 1857.

702. Robert Lewis Jones, Chester—Improvements in regulating clocks by electricity.
704. William Makin, Hollingworth, Cheshire—Improvements in furnaces and apparatus for generating steam.
706. Simeon Denham, Strafford-square, Wakefield—A self-acting machine for the delivery of postage and receipt stamps.
708. John Robert Reid Humfrys, Salford—Improvements in apparatus for burning gas.
710. James Davis Cooper, 26, Great James-street, Bedford-row—Improvements in producing engraved surfaces from surface printing.

Dated 12*th March*, 1857.

712. Albert Viscount de Waresquiel, and Julien D'Helle, Paris—Improvements in railway carriages.
714. John Avery, 32, Essex-street, Strand—An improved method of preserving butter. (A communication.)
716. John Shaw and William Manwarning, Britannia Works, Banbury—Improvements in machinery or apparatus for cutting or reducing turnips or other vegetable substances.
718. William Edward Newton, 66, Chancery-lane—Improvements in the process of, and apparatus for, tanning. (A communication.)

Dated 13*th March*, 1857.

720. Emmanuel Berger and Jules Edouard Matile, Paris—Improvements in machinery for beating and brushing carpets.
722. William Ramsey Nevins and Joseph John Yates, New York—improvements in preparing and baking bread and biscuits, and in machinery employed therein.
724. William Hesketh, Accrington, Lancashire—Improvements in looms.

Dated 14*th March*, 1857.

726. Charles Cowper, 20, Southampton-buildings—Improvements in the manufacture of artificial leather, or a substitute for leather. (A communication.)
728. Robert Macdonald, Glasgow—Improvements in sewing or embroideridg textile fabrics. (Partly a communication.)
730. Joseph Pimlott Oates, Edrington, Warwickshire—Improvements in machinery for the manufacture of bricks, tiles pipes, and other articles made of plastic materials.
732. Henry Bradley and Helmit Wray, Hull—Improvements in beaters used in thrashing machines.

Dated 16*th March*, 1857.

734. George Marshall, Morpeth, Northumberland—An improved saw-setting apparatus.
736. James Thompson, Black-Ruthven, Perth—Improvements in mowing and reaping machines. (A communication.)
738. Henry Martin, Hanwell—Improvements in apparatus for the supply of water to steam boilers.
740. Jules Mo[illegible] 19, Rue de l'Echiquier—Improvements in warming and ventilating.
742. Richard Archibald Brooman, 166, Fleet-street—Improvement in apparatus for splitting leather, in order to manufacture tubes, sheaths, and other articles. (A communication.)

Dated 26*th March*, 1857.

843. Uriah Lane, 46, Regency-square, Brighton—An improvement in the transmission of motive power.
845. William Thomas Clarke, 11, Cottage-place, City-road—A portable metallic spring mattress.
847. Dominico Tomasini, Great Coram-street—Improvements in the construction of easy chairs and chamber commmodes.
849. Augustus Frederick Butler, Ceylon—Improvements in machinery for pulping coffee.
851. Jason J. Palmer, New York—Improvements in the construction of steam boilers.
853. George White, Port Glasgow, Renfrew—Improvements in weaving.

Dated 27*th March*, 1857.

855. Emil Von Lowenstein, 3, New-street, Bishopgate-street—Improvements in the construction of ovens for the manufacture of coke.
859. George Sugden and Jonas Briggs, Bradford—Improved machinery for weaving checks or figured fabrics.
861. Charles Martin, 87, Castle-street, Reading—Improvements in working signal apparatus on railways.
863. William Ross, Glasgow—Improvements in apparatus for regulating the passage of fluids.

Dated 28*th March*, 1857.

867. Edward Blackett Beaumont, Woodhall, Barnsley—Improvements in lamps and apparatus used in coal mines.
869. Hippolyte Benigne Girard, Paris—Improvements in insulating telegraphic wires or conductors, and in apparatus for stretching such wires.
871. John James Russell, Wednesbury, Staffordshire—Improvements in the manufacture of metal tubes.

Dated 30*th March*, 1857.

873. Arthur Neild and Nathaniel Buckley Sutcliffe, Ashton-under-Lyne—Improvements in treating or cleansing certain descriptions of cotton waste.
875. David Jack, Glasgow—Improvements in washing or cleansing textile fabrics and materials.
877. William Childs, jun., Brighton—Improvements in the construction of expansible boxes, cases, and receptacles.
879. John Henry Johnson, 47, Lincoln's inn-field—Improvements in warming and ventilating apartments. (A communication.)
881. Arthur Granger, High Holborn—An improved manufacture of safety envelope.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

898. Richard Egan Lee, 3, Giltspur-street—A portable printing apparatus, adapted alike for moveable type, lithography, and copper-plate.—1st April, 1857.
962. Gilbert Burrington, Chudleigh, Devon—Making the stop funnel for the prevention of waste of liquids whilst bottling or transferring them from one vessel to another.—6th April, 1857.

WEEKLY LIST OF PATENTS SEALED.

April 14*th*.

2400. Richard Sumner.
2401. John Knowles, jun.
2406. George Guillaume.
2407. Joseph Henry George Wells.
2408. Edward Hallen.
2409. James Burrows.
2410. Bennet Johns Heywood.
2415. Alfred Tooth.
2418. Charles Napoleon Wilcox.
2458. Josiah George Jennings.
2460. Anthony Lorimier.
2466. John Cowdery Martin.
2508. William Benson.
2519. Thomas Allan.
2527. William Septimus Losh.
2582. Jean Louis Marie.
2533. Adolphe Aubril.
2541. Thomas Smith Henzell.
2546. Frederic Whitaker.
2569. James Coul Sinclair.
2587. William Gray and John Tate.
2844. John Carter Ramsden.
2916. Thomas Peake.
3002. Charles Fay.
3020. Theodore Dethier.
271. James Thom.
328. John Henry Johnson.
416. William Edward Newton.
420. Thomas Wingate.
421. Charles Wye Williams.
435. James Cocker.

Patents on which the Stamp Duty of £50 has been Paid.

April 6*th*.

814. John Rankin.
817. John Robert Johnson.

April 7*th*.

861. Samuel Colt.

April 8*th*.

923. Aimé Balvier.

April 9*th*.

843. Zachariah Round.
845. Edward Lavender.
850. Thomas Schofield Whitworth.
859. William Coltman.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
3966	April 3.	Hollow Flame Deflector, or Inverted Bridge for Furnaces	James Adamson and Samuel Hilton	4, Oxford-terrace, Islington.
3967	,, 3.	A Mounting for Bayonet Scabbards	John Loude Tabberner	4, Trafalgar-square.
3968	,, 4.	Self-adjusting Spring Watch Protector	Charles Gammon	2, Bury-place, Bloomsbury-square.
3969	,, 7.	The Persian Coal-box	Frederick Baker	106, High-street, Marylebone.